

REMARKS

By the above amendments, claims 1, 2, and 11 are revised to place this application in condition for allowance. Currently, claims 1-16 are before the Examiner for consideration on their merits.

In review, each of independent claims 1, 2, and 11 are revised to clarify that the magnetic powder is made up of acicular particles. Support for this revision can be found on page 8, the paragraph beginning on line 16. Thus, no new matter is introduced by this revision. Claim 1 is also revised to include Formula 1 as found in claim 2.

Applicant respectfully traverses the rejection of all claims. The traversal is set out below under the headings of the Invention, applied prior art and rejected claims.

INVENTION

The invention relates to an improved magnetic powder of the size of 80 nm or less, and particularly to a powder having a tap density of 0.7 g/cm³, which is found in both of claims 1 and 2. The significance of this limitation can be seen when considering that ultra fine acicular particles, i.e., smaller than 80 nm in the average diameter, are more stable when they partially aggregate to form secondary particles than when mono-dispersed in the state of primary particles. This is explained on page 4, the paragraph beginning at line 14. Because of this aggregation, when coating the particles with a silane coupling agent, the coating does not uniformly adhere to the surfaces of the particles. Referring to Table 1 of the specification, it can be seen that particles processed according to the invention have a tapping density of more than 0.7 g/cm³ and that the powders of the invention assumed a

substantially monodispersed state even when the particle diameter was 70 nm or less, see page 31 lines 1-3. The fine particles of claims 1 and 2 are smaller than 80 nm and have a tap density of 0.7 g/cm³ or greater, and these properties are present without decreasing of the magnetic properties such as coercive force Hc and saturation magnetization σ_s as compared to its raw powder. This means that the particles are mono-dispersed without aggregation and they maintain excellent magnetic properties.

In addition, the particles have excellent $\Delta\sigma_s$ and high ignition point, which are indices of the weatherability, thereby permitting the realization of high recording density of a magnetic medium using the ultra-fine acicular magnetic particles, see the second paragraph on page 14 to the first paragraph on page 15. As will be shown below, the prior art does not teach the claimed powder or method of making.

JP 2001-357501 (JP '501)

All powder claims are rejected under 35 U.S.C. § 102(b) based on JP '501. The rejection of claims 1 and 2 are addressed separately below since each has different arguments in support of patentability.

Claim 1

In the rejection, the Examiner contends that the tap density of greater than 0.7 g/cm³ is taught in JP '501, relying on Tables 1-5 and paragraphs [0010-0014, and 0030]. The problem with this approach is that the information regarding tap density in JP '501 relates to a non-magnetic material, not a magnetic powder as is required in claim 1. More particularly, JP '501 teaches a non-magnetic powder for a non-magnetic layer of the magnetic medium. Paragraphs [0006, 0010-0014] and

Tables 1-5 say nothing regarding the tap density of a magnetic powder. Paragraph [0030] discloses a tap density of a non-magnetic powder being 0.3-1.5 g/ml, but this is not a magnetic powder. In JP '501, paragraphs [0027-0035] relate to a non-magnetic powder to form a non-magnetic layer which exists between a base film and a magnetic layer.

Since JP '501 does not teach a tap density for a magnetic powder as claimed, JP '501 cannot anticipate claim 1 and the rejection must be withdrawn.

Moreover, there is no reason why one of skill in the art would conclude that just because JP '501 teaches a particular tap density for a non-magnetic powder means that this could be equally applied to a magnetic powder. Any such contention is grounded in hindsight and could not be used to formulate a future rejection of claim 1.

It is also argued that the values for the ignition point and oxygen content are not disclosed in JP '501, and without this disclosure, JP '501 fails to anticipate claim 1 for this reason. The oxygen content and ignition points are important properties of the claimed powder and their significance is explained in the second paragraph on page 17 and the last paragraph on page 18, respectively. The failure of JP '501 to teach these limitations in the context of a magnetic powder is further substantiation that the rejection based on 35 U.S.C. § 102(b) is improper and should be withdrawn.

Claim 1 also requires the combination of tap density and Formula 1. The importance of Formula 1 can be seen from the specification, the last paragraph on page 17 and the first paragraph on page 18. More particularly, Formula 1 is important since it demonstrates that high coercive force could be realized in ultra-fine acicular particles, because good acicular shape of the inner metal core could be retained, even

if the particles are smaller than 80 nm. Generally, the finer the acicular particle, the smaller the volume and the more active the particle is to oxygen. This means that the metal core shape tends to be far from acicular due to the formation of a rather thick and irregular oxide film on the surface. Abiding by Formula 1 as well as the tap density leads to improved properties of the invention, and it cannot be said that JP '501 teaches these features.

Claim 2

JP '501 teaches a magnetic layer comprising a magnetic powder and a grinding agent such as α -alumina and carbon black. The carbon black acts as an antistatic agent for the magnetic layer. The carbon is not part of the magnetic powder. Rather, it is dispersed in the magnetic layer along with the magnetic powder and the grinding agent. Lacking a teaching of the presence of C as part of the powder itself, JP '501 cannot be said to teach this limitation and the rejection under 35 U.S.C. § 102(b) of claim 2 is improper and must be withdrawn.

Claim 2 is also patentable over JP '501 for the same reason as expressed above for claim 1 regarding tap density, oxygen content, Formula 1, and ignition point.

In addition, the limitations relating to $\Delta\sigma$ s are not found in JP '501. The importance of $\Delta\sigma$ s can be seen in the third paragraph of page 18.

Failing to teach the limitation of $\Delta\sigma$ s as found in claim 2 means that the rejection based on JP '501 and 35 U.S.C. § 102(b) must be withdrawn.

JP '501 and either United States Patent No. 6,531,211 to Hayashi et al. (Hayashi) or JP 7-272254 (JP '254) or JP-7-94310 (JP '310)

In this rejection, the Examiner relies on the secondary references to allege that it is known to coat magnetic powders with silane coupling agents in order to improve dispersability of the particles. Therefore, the Examiner feels that it would be obvious to coat the powder of JP '501 with a silane coupling agent for such a purpose.

Applicant submits that the rejection based on any of the three secondary references is flawed on the grounds that the reasoning for the combination is defective and/or that the features of claims 1 and 2 could not be obtained when using the secondary references in combination with JP '501.

Moreover, the reliance on the secondary references misses the point of the invention. Applicant is not claiming to be the first to use a silane coupling agent with a magnetic powder. This use is already discussed on page 4 of the specification. However, Applicant is the first to produce a powder having the features of claims 1 and 2. The mere fact that any of the secondary references may have employed silane coupling agents still does not teach the features of claims 1 and 2. Thus, these claims are patentable notwithstanding the disclosure of the three secondary references; none of them teach the powder features of these claims.

Hayashi

Hayashi discloses black plate-shaped ferrite composite particles with a magnetoplumbite structure having a coating layer comprising an organosilicon compound and a carbon black coating. The magnetoplumbite type ferrite has a composition such as described in lines 28-36 in col. 6. of Hayashi, which is not the same as the composition of the magnetic powder of claims 1 and 2.

Second, the crystal magnetic anisotropy of Hayashi differs from the shape magnetic anisotropy of the acicular particles of claims 1 and 2. In Hayashi, the important role of the organosilicon compound layer is to ensure the adhesion force of the carbon black on the ferrite particles, see for example lines 46-49 of col. 3 of Hayashi, the carbon black layer being the outermost surface layer of the particles. Given these differences, there is absolutely no reason why one of skill in the art would take the organosilicon compound layer formed on the magnetoplumbite ferrite particles of Hayashi for adhering a carbon black layer and use the organosilicon compound layer on a magnetic powder such as that taught by JP '501, which has no carbon black layer. The Examiner is engaging in hindsight to formulate the rejection using Hayashi and this is an improper foundation for a rejection under 35 U.S.C. § 103(a). Thus, the rejection based on JP '501 and Hayashi must be withdrawn.

JP '254

The failing of the rejection of JP '254 is that the Formula 1 now found in claims 1 and 2 is not met. JP '254 teaches acicular magnetic particles that have been surface treated with a silane coupling agent. In Table 1 of JP '254, only the particles of Examples 6 and 7 have an average major axis length of 0.07 microns (70 nm) and 0.05 microns (50 nm). The particles have axis ratios of 6 and 5 and coercive force 1740 and 1730 Oe, respectively. Other Examples and comparative Examples have the average major axis length larger than 80 nm.

Important to note here is that if the fine particles of Examples 6 and 7 are surface treated with silane, Formula 1 could not be satisfied. According to the method explained in the third paragraph on page 11 of the specification, the particle

volumes of both particles would be calculated by the applicant as 7483.1 and 3927.0 nm³, under the condition that the particles are acicular in shape and have an average minor axis lengths of 11.67 nm and 10 nm calculated using each axis ratio above. Then, each particle volume is inserted into V in the right column of Formula 1, "325 x ln V -900", the result leading to the values of 1999.1 and 1789.6, which are clearly larger than the 1740 and 1734 Oe values of Table 1 of JP '254. This means that Examples 6 and 7 of JP '254 cannot satisfy Formula 1. Put another way, the fine powders of JP '254, even if treated with a silane coupling agent, could not reach the level necessary for high-density magnetic recording, which has been attained by the inventive powders of claims 1 and 2.

These levels, it is necessary to develop the necessary dispersion means, referred as [A] in the specification for the fine particles prior to contact with the silane coupling agent. Also, the surface properties of the fine particles are improved using [B] as detailed in the specification. [A] is explained from line 19, page 10 to line 10, page 11 and items (1-5) in the second paragraph of page 12. Lines 1-11 on page 12 address [B]. It is clear that JP '254 says nothing about the importance of preparing the powder via the appropriate dispersion means and surface treatment. Thus, the powders of claims 1 and 2 could not be attained via the teachings of JP '254 and this reference and JP '501 does not establish a *prima facie* case of obviousness.

Moreover, JP '254 deals with magnetic powders whereas the powders relied upon in JP '501 are non-magnetic powders. Applicant contends that given that two different types of powders are used in JP '254 and JP '501 means that one of skill in the art would not be taught to use the teachings of JP '254 on the powder of JP

'501. The Examiner is merely picking facets of JP '254 that are not taught in JP '501 to formulate a rejection, while failing to substantiate why such a modification of JP '501 should take place.

Lastly, Applicant also makes the point that the mere use of a silane coupling treatment on a magnetic powder does not mean that the claimed powder and its characteristics are attained. As noted above, the dispersing of the powder as well as its surface treatment are important in attaining the claimed properties. This precludes the Examiner from taking an inherency position when using the silane coupling treatment of JP '254 on a magnetic powder.

JP '310

JP '310 discloses an acicular alloy magnetic particles coated with a polymer that has been polymerized from amino-propyl-tri-methoxysilane monomer or amino-propyl-tri-ethoxysilane monomer. The powder being coated has an average major axis length of 0.2 microns or smaller, a coercive force of 1500 Oe or higher, and a saturation magnetization of 140 emu/g or lower. These features can be found in claim 1 of JP '310.

The polymerization is carried out under the condition that the monomer listed above contacts the particles in the gaseous phase, preferably using an inert gas for carrying the monomer. However, JP '310 says nothing about the way to coat the particles being less than 80 nm with the polymer. In fact, all particles coated with the polymer have major axis lengths from 0.09 to 0.14 microns (90-140 nm) as shown in Table 3 on page 10. Therefore, particles having a tap density of 0.7 g/cm³ or greater and an average diameter of smaller than 80 nm have not been taught or

suggested by JP '310. Consequently, combining JP '310 and JP '501 do not establish a *prima facie* case of obviousness against claims 1 and 2.

The rejection based on the combination of JP '501 and JP '310 is flawed for the same reason as outlined above regarding the combination of JP '501 and JP '524. That is, JP '501 does not teach the features of claims 1 and 2 and even if JP '310 were combined with JP '501, this does not mean that all of the features of claims 1 and 2 are found.

CLAIMS 11 and 12

The rejection of claims 11 and 12 is traversed on the grounds that the Examiner has not established a *prima facie* case of anticipation. In the rejection, the Examiner cites the two prior art references that are mentioned on page 4 to support the position that the method of claim 4 is known.

The description on page 4 of the two references relates to their disclosure regarding using a silane coupling agent to improve weatherability. The problem with the rejection is that claim 11 is not merely claiming such a use. Rather, claim 11 also defines a method that also defines a certain degree of dispersion β . There is no admission in the specification that the degree of dispersion β is disclosed in the two references and this alone precludes an allegation of anticipation.

Moreover, the degree of dispersion β is shown in Table 1 as varying for the inventive and comparative examples. This means that the Examiner cannot baldly conclude that the claimed degree of dispersion β would necessarily be found in the prior art powders.

Claim 12 is separately patentable over the cited prior art since there is no basis from which to conclude that the step relating to the surface treatment of the particles is disclosed in either JP '254 or JP '310.

If the Examiner continues to reject claims 11 and 12, the Examiner is requested to provide identification of the exact basis for alleging that the steps of these claims are disclosed in the prior art.

SUMMARY

Based on the arguments above, it is submitted that the Examiner has failed to establish a *prima facie* case of anticipation against the powder claims based on JP '501 since this reference does not disclose magnetic powders. The rejection based on 35 U.S.C. § 103(a) is flawed since the mere fact that the secondary references teach using a silane coupling agent does not change the fact that JP '501 is unrelated to the magnetic powders of claims 1 and 2. In addition, there is no reason to combine Hayashi with JP '501 and the features of claims 1 and 2 are not disclosed even if JP '524 and JP '310 are combined with JP '501. Lastly, a *prima facie* case of anticipation has not been established for method claims 11 and 12.

Accordingly, the Examiner is requested to examine this application in light of this amendment and pass all pending claims onto issuance.

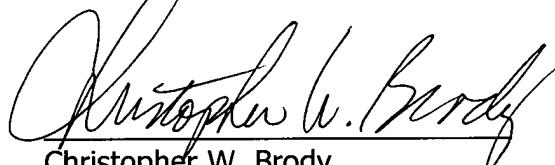
If the Examiner believes that an interview would be helpful in expediting the allowance of this application, the Examiner is requested to telephone the undersigned at 202-835-1753.

The above constitutes a complete response to all issues raised in the Office Action dated September 19, 2007.

Again, reconsideration and allowance of this application is respectfully requested.

Applicants respectfully submit that there is no fee required for this submission, however, please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,
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